

QUALITY ASSURANCE

By Rear Admiral D G (Spike) Spickernell CB

This is the path that led me to produce the then totally new concept called Quality Assurance. As so often happens, it began with tragedies, the loss of the submarines *Truculent* and *Affray*, and an explosion in the engine-room of the submarine *Alderney* when I was on board. As the Submarine Trials Officer I was meant to be in the *Truculent* when it left Sheerness for sea trials after a refit but was delayed by an X-craft trial in Devonport that did not go according to plan. On arrival at Sheerness I reported it to the Semaphore Tower and soon after found myself aboard H M S *Cowdrey* interviewing survivors from the *Truculent* as they were picked up from the sea. I was also at sea in the *Affray* the day before the submarine sailed it on its last voyage. I always stressed that the dockyards were not at fault. It was the **system** that was wrong, basically because there was no system. Everything was too departmentalized.

As a result of my experiences as Submarine Trials Officer I was appointed to Portsmouth Dockyard in charge of submarine refits and immediately found another and glaring weakness - there was absolutely no feedback. Despite my two years of conducting trials after refits and reporting fully the problems I had encountered, I found the dockyard was totally unaware of this. There was no feedback whatsoever between user and supplier.

Promoted to Commander, I did four years at sea as Squadron Engineer Officer Frigates and then Squadron Engineer Officer Submarines before being appointed Superintendent Underwater Weapons Launching Establishment, Bournemouth, and then Deputy Captain Superintendent Admiralty Underwater Weapons Establishment, Portland. Here is a list of the things I learnt from these appointments, which later became part of my QA philosophy.

- a) There was little or no feedback between those who specified the requirements and the scientists who did the research and development. I therefore instituted a procedure known as 'stage chart procedure' to bring both sides together at regular meetings with formal agendas, which included design review, provision of spares, handbooks, and training for the future users. The latter eventually attended these meetings.
- b) It is essential to do costings at the earliest possible stage in development to ensure fitness for purpose at a cost that can be afforded.
- c) Concepts must be cradle to grave and include reliability and maintainability costings.
- d) Good equipment sent into service without the appropriate operating instructions and handbooks can soon get a bad name.
- e) Equipment for testing made in the workshops and laboratories of an R and D establishment bore little relationship to equipment made by the contractor who put in the lowest bid. Hence the need to assess the contractor's procedures, processes and controls before allowing a company to tender. This checking would need to assess a company's

financial strength and controls, as it would be catastrophic if a contractor went bankrupt whilst building a ship.

f) In order to maintain the quality of a product during its active life the above controls would be necessary in those companies and dockyards chosen for maintenance and refits.

Promoted to Captain, I spent two more years in Portsmouth Dockyard before becoming Commanding Officer of HMS Fisgard, the Engineering Apprentice Training Establishment in Cornwall. This was the appointment I loved most of all in my 38 years in the Navy.

Then came the breakthrough that was to change my life and eventually lead to ISO 9000 which is now used in 160 countries, where the registrations of companies, hospitals and schools, training establishments, police forces and many other facilities now totals more than a million. The Polaris programme came to an end and was considered to be a success from which lessons could be learned. A new post, Deputy Director Naval Ship Production, was created in the Ministry of Defence (Bath), to head a unified overseeing service, to study the reasons for success of the Polaris programme and to incorporate the new philosophies in the large programme of warship building taking place at that time, 1967. I was appointed and gave the whole project the title 'Quality Assurance'. So began the long haul that years later would become my life's work, namely to improve the quality of goods and services throughout the world and above all to aid the transfer of technology to developing countries.

The first documents I used were of American origin, GRAQs (general requirements for the assurance of quality in ships) and SCITs (standard conditions of inspections and tests). Despite their names these were not QA documents as they did not include any reference to design and called for quality control procedures to be put in place after a contract had been placed. However, they were a start and I do not belittle them in any way.

The first surface ships to be built in which full QA procedures were implemented were the Type 21 and 42 frigates, which have now come to the end of their 25-year lives. In the event it was found that their operational periods between refits could be extended from two years to five years, thus more than doubling their operational availability. Huge savings came from the small extra outlay necessary during the design and build phases.

At the same time and in addition to my duties in the Ministry of Defence, there was a government-to-government contract to assist India in setting up a warship building industry in Mazagon Dock Bombay and to build a Leander class frigate. I was appointed to manage the project from the British input and handled it by getting Yarrow and Vickers, the shipbuilders controlling the contract, to break the work down into small packages containing full QA requirements. The Indians did their work efficiently and the *Nilgri* was launched in due course by Mrs Gandhi, who invited me to lunch, a very great honour. Thus began my desire to assist countries that wished to develop technically. Later on I was to handle contracts to modernize the standards organizations of China and

Saudi Arabia and also became an honorary director of the Turkish Standards Institute. I have also lectured in nearly every country in the world.

Then came the breakthrough that would one day lead to ISO 9000. The Ministry of Defence (Whitehall) was concerned at the huge costs of maintaining 16,500 civilian inspectors in factories and shipyards throughout the United Kingdom. They set up an independent committee of industrialists and consultants in 1968 to examine the system and make recommendations. The committee recommended that the purchasing organizations of the Army, Navy, Air Force and Ministry of Technology should adopt the quality assurance procedures used by the Navy and that I should head up a small team in London to produce and implement the new procedures.

Needless to say, only the Navy thought this a good idea! However, thanks to political pressure, the committee's recommendations were accepted and in 1970 I found myself promoted to Commodore, sitting in an office in the Ministry of Technology London with a small team of civilians drawn from the three services. I reported to the newly formed Defence Quality Assurance Board, a truly formidable team. The Permanent Secretary MoD, Chief Scientist MoD, Controller Navy, Controller Aircraft, Master General Ordnance, to name but a few.

The introduction of QA across the MoD was not going to be easy! However, my small team and I got on with our task, which was to produce the documents necessary to ensure contractually that the staff in the field would be permitted by the defence industry to assess its capability before contracts were placed. At the same time I carried out an exhaustive lecture tour to get the support from industry that was not coming from the Board. After all, it had been industry that had originally claimed that there were too many government inspectors on their premises. Because of the industrial support received the team's confidence grew and the necessary documents were quickly produced. But by what means could they be introduced? The Director General Defence Contracts was a most helpful man but could not use them because although compliance would mean a company was able to tender it did not mean that it would ever get a contract. It was Geoffrey Souch, a key member of my staff, who came up with the answer. Let us produce them as Defence Standards. And so they were published as Defence standards and 05-21, 05-24, and 05-29. They were later to become BS 5750 and then ISO 9000. I was promoted to Rear Admiral in 1971 and given the title Director General Quality Assurance.

My team then produced a highly coloured brochure, which was sent to over 30,000 companies entitled the *New requirements for defence quality assurance*. Things were now moving forward. Training of the staff to be employed in quality auditing was carried out by two eminent American consultants, namely Joe Juran and Marvin Johnson. I was invited to visit NASA Houston to study the procedures and processes that led to their success. I also became friendly with John Riordan, the head of QA in the Pentagon, to whom I was always grateful for the following advice: 'You can tell industry what you expect of them but never how to do it.' On my return to the United Kingdom the Defence Standards were modified to take account of what I had learned. I have always believed

that you can achieve anything as long as nobody wants to take the credit. Thus there was very much an international input in these new defence standards and this was acknowledged.

After 38 years service the time came for me to leave the Navy in 1975. I joined the British Standards Institution and soon became Technical Director, responsible for the production of all standards.

The reason I joined the British Standards Institution was because when I gave a lecture at Rolls-Royce Derby, Bob Feilden approached me. He was then Director General of the British Standards Institution and told me not to take a civilian job without contacting him first.

At the British Standards Institution I was responsible for all standards. At that time there were 10,000 committees in being with some 30,000 committee members. There was not much time for quality assurance

In 1976 Sir Frederick Warner who was the chairman of the British Standards Institution was invited to give a report to the government on quality assurance. Needless to say he invited me to become a member of his committee, the main recommendation of which was that all major purchasing organizations in the UK should use a common QA standard when purchasing goods and services. So the BSI/QA committee was activated and I invited it to stick as closely as possible to the defence standards, otherwise the UK would always have separate criteria for defence and non-defence requirements. The committee did its job well and in 1979 BS 5750 was published. It immediately gained general acceptance by all major purchasing organizations. BSI decided to use it in conjunction with its well-known kite mark scheme. This clearly improved assurance to the customer. The kitemark scheme had been in operation for some 60 years. To a purchaser it only meant that the item concerned conformed to a British Standard when tested. Now it meant that the item was manufactured under conditions that were regularly audited to ensure that every item conformed to specification.

The introduction of this new standard caused great interest across the world especially in Canada, which I was invited to visit. I was most impressed by all that they were doing. At this time the British Standards Institution fed into the International Organization for Standardization a proposal that a technical committee should be set up to produce internationally agreed quality assurance standards in order to make world trade easier. BSI was surprised by the number of votes against this proposal. However it got through by one vote and Technical Committee ISO/IEC 176 was set up. The Canadian standards body was given both the secretariat and the chairmanship. BSI was given control of the quality systems committee that would produce the standards.

In 1981 I became the Director General of BSI with the mandate from the then President (Sir Frederick Warner) to get on with quality assurance. Shortly afterwards I received a telephone call from Yorkshire Imperial Metals which was terse and to the point. (Spike you got us into this and we have had 130 assessments from potential customers so far this year. What are you going to do about it?) I knew the answer, which was surprisingly simple. Accountants have their standard accounting procedures and companies pay them to be audited annually. Others accept their verdicts in good faith. They make mistakes but then who doesn't? The UK already had Certification bodies such as BSI, Lloyds and the Pressure Vessels Quality Assurance Board. Get them to work to the same rules, accredit them and encourage companies to seek certification to BS 5750. The carrot for companies would be inclusion in an officially recognized list of quality assured companies and general acceptance that purchasers would recognize this list and cease to demand their own vendor ratings. The cost savings would be enormous, in the range of billions of pounds annually across the world

It is one thing to have ideas, another to get them accepted. By this time Mrs Thatcher, the Prime Minister, had become interested and I had been called to see her on at least two occasions. She hosted a Design for Quality discussion at Number 10 Downing Street. Eric Williams, a civil servant, deserves a lot of credit. He supported these ideas at the expense of his own career within the Department of Trade and Industry. The result of this activity was a government White Paper (Standards quality and international competitiveness). It was an instant bestseller and was translated into nearly every language in the world. In 1982 a Memorandum of Understanding was signed between the government and BSI. A national Quality Campaign commenced and for the next year I spent a lot of time in the company of John Butcher, a government minister, lecturing to many of the major companies in the UK. A film was made and I took part in the making of a video which I still enjoy watching. Sir John Egan, who was then chairman of Jaguar's, played a pivotal role

Because there were now many companies seeking certification to BS 5750 a number of new certification bodies were established. The question then arose as to their competence. A company that was being certified had a right to know that their auditors had been through some vetting procedure. It was decided to call this new system 'accreditation' and accordingly the National Accreditation Council was set up. The government undertook to finance the Council and entrusted its setting up to me personally, provided that it remained independent of BSI. I employed a friend of mine in whom I had every confidence, namely Captain H R C Young. He did an excellent job and his work became the basis for similar activity in ISO. Needless to say I expected BSI to be the first organization to be accredited but it was not. Congratulations to Lloyd's Register of Shipping! At least this showed that the NAC was impartial!

In 1985 I was elected to be Vice-President of ISO, a great honour. That gave me three years to help and advise on the setting up of the ISO 9000 scheme. An organization, CASCO, was set up within ISO to manage the scheme. Its first Chairman was John Ware of BSI. He and his team did a first-class job. The Canadian standards organization deserves credit for producing the format whereby the millionth registration has now taken

place and the scheme is used in 160 countries. Nor should the efforts of the staff of ISO be forgotten, especially those of Dr Larry Eicher, Secretary General of ISO at that time. I must also mention the Russian Technical Officer responsible for co-ordinating the various parts of the standard and producing ISO 9000. He was enthusiastic and a great help to me.

The production of ISO 9000 has been a long journey, starting when I was a small child whose cheaper Christmas presents often broke in a very short time. It was many years before I defined quality as fitness for purpose at a price one could afford. In other words a Rolls-Royce car and a Mini can both give customer satisfaction. Reliability is quality over time and therefore a more expensive item should be more reliable. I was fortunate to be involved in standards after a long time in the Navy. I soon realized that over 100 countries working together to produce international standards to improve the quality of life created both trust and understanding and also friendship. Furthermore the way forward for the poorer countries is through technical progress in which ISO has an important role to play. Protecting people in their everyday lives without their knowing it and at the same time improving their lives with better quality goods and services is most rewarding and that is the task of the national and international standards organizations.

DGS

2004-04-28